Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan	)	GN Docket No. 12-268

REPLY COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

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Table of Contents

Page

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	)	
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I. INTRODUCTION AND SUMMARY

CTIA – The Wireless Association® ("CTIA")[1] hereby submits these reply comments in response to the Public Notice released by the Wireless Telecommunications Bureau (the "WTB" or "Bureau") seeking comment on issues related to the proposed 600 MHz band plan.[2] In the Public Notice, the Bureau sought comment on variants of its "Down from 51" band plan concept as originally introduced in last September's *Incentive Auction NPRM*.[3] CTIA and its member companies are highly invested in the success of the incentive auction, and believe that an effective band plan will play a key role in meeting the goals of Congress and the Commission in

[1] CTIA – The Wireless Association® is the international organization of the wireless communications industry for both wireless carriers and manufacturers. Membership in the organization covers Commercial Mobile Radio Service ("CMRS") providers and manufacturers, including cellular, Advanced Wireless Service, 700 MHz, broadband PCS, and ESMR, as well as providers and manufacturers of wireless data services and products. More information about CTIA is available on the Association's website at http://www.ctia.org/aboutCTIA/.

[2] Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan, Public Notice, GN Docket No. 12-268 (May 17, 2013) ("Public Notice").

[3] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, FCC 12-118 (Sept. 28, 2012) ("NPRM").

establishing the incentive auction. Indeed, several parties have cited a well-reasoned band plan as essential to the incentive auction's success.[4]

Participants in this proceeding have highlighted several key issues that the Commission should take into account in developing a band plan. In its initial Comments, CTIA highlighted five key components that should drive the Commission's thinking as it develops a 600 MHz band plan. The record developed in opening comments demonstrates that the wireless and broadcast industries continue to focus on these principles, and CTIA urges the Commission to develop a band plan that incorporates them. Commenters also continue to highlight the challenges created by broadcasters and wireless carriers operating on co- and adjacent channels in neighboring markets. The Commission should closely examine this problem and adopt a band plan that properly addresses it. Finally, commenters overwhelmingly agreed with CTIA's finding that the proposed "Down from 51 Reversed" band plan is rife with flaws and should be dismissed.

While participants in this proceeding have made several important findings regarding the 600 MHz band plan, some parties have advanced proposals that are of great concern to CTIA, and that the Commission should reject. First, the Commission should reject calls from certain commenters who seek to curtail the amount of spectrum cleared for licensed mobile broadband

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[4] *See, e.g.*, Reply Comments of CTIA – The Wireless Association®, GN Docket No. 12-268, at 14 (Mar. 12, 2013) ("CTIA NPRM Reply Comments"); Comments of AT&T Inc., GN Docket No. 12-268, at 14 (Jan. 25, 2013 ("AT&T NPRM Comments") ("This auction can succeed only if the Commission's band plan is sound."); Comments of Nokia Siemens Networks US LLC, GN Docket No. 12-268, at 7 (Jan. 25, 2013) ("Nokia Siemens Networks NPRM Comments") ("The statutory structure of the incentive auction as a one-time opportunity amplifies the importance of it being a success"); Comments of QUALCOMM Incorporated, GN Docket No. 12-268, at 1 (Jan. 25, 2013) ("QUALCOMM NPRM Comments") ("For this proceeding to be successful, the FCC must develop rules and a band plan that provides as much clarity and certainty as possible to current broadcast licensees and to future flexible use licensees . . . to encourage the highest levels of participation from both groups and for the agency and America to reap the greatest value.").

in the name of ensuring nationwide uniformity. Second, the Commission must deny proposals to permit 50 kW broadcast operations in the 600 MHz band, as this would have a preclusive effect on effective use of the 600 MHz band. Third, and finally, the Commission should decline to adopt unnecessary additional protections for incumbent wireless medical telemetry operations on TV Channel 37.

Finally, CTIA urges the Commission to look to the future and continue its work toward providing the complete repacking algorithm for public comment. While not addressed in the Public Notice, public release of the repacking algorithm will afford all effective stakeholders the opportunity to understand the Commission's methodology, which in turn will facilitate the creation of a band plan that maximizes the amount of spectrum allocated to mobile services.

II. THE RECORD FURTHER ESTABLISHES THE KEY ELEMENTS OF A SUCCESSFUL BAND PLAN.

Key stakeholders in this proceeding have allocated tremendous resources toward obtaining a better understanding of critical issues underlying the development of a 600 MHz band plan. For the incentive auction to be a success, the Commission's goal should be to thoroughly investigate the findings of key technical stakeholders and move forward with a band plan that has the approval of the majority of interested parties. CTIA's initial comments in this proceeding highlighted the growing consensus among stakeholders supporting a "Down from 51" band plan approach[5] based upon key principles. The record demonstrates that this support remains strong. Further, commenters continue to highlight the challenges of co- and adjacent-channel interference caused by variable band plans where broadcast and wireless operations

[5] As CTIA indicated in its initial Comments, several parties to this proceeding have made varying band plan proposals that they have referred to as "Down from 51" band plans. By using the expression "Down from 51" in these reply comments, CTIA is not endorsing any specific band plan proposal submitted to the Commission. Rather, CTIA uses this terminology to refer to any band plan that meets the criteria described in paragraph 178 of the *Incentive Auction NPRM.*

occupy the same or adjacent channels in nearby markets. Finally, the record in this proceeding demonstrates near-unanimous opposition to the proposed "Down from 51 Reversed" band plan, and thus the Commission should not continue to pursue this option.

A. There Continues to be Widespread Support for the Five "Key Principles" Articulated by CTIA.

CTIA continues to believe that there are several key components that should drive the Commission's thinking as it develops a band plan. First, the Commission should focus on pairing as much spectrum as possible above TV Channel 37. Second, the Commission should license the 600 MHz band in 5 MHz "building blocks." Third, the Commission must create a band plan that makes every effort to deliver a consistent baseline of nationwide downlink[6] bandwidth for paired spectrum. Fourth, the Commission should adopt a band plan that includes interference-preventing guard bands that can serve as a home to qualifying unlicensed operations. Fifth, and finally, any band plan based on frequency division duplex ("FDD") technology would require a duplex gap of 10 MHz or more. The most recent round of comments demonstrates continued widespread support for these five principles.

Focus on Paired Spectrum Above TV Channel 37. CTIA continues to support the National Broadband Plan's goal of reallocating 120 MHz of broadcast television spectrum to wireless operations. However, CTIA acknowledges that this may not be achievable in all markets. Most stakeholders agree that the Commission should focus its efforts on allocating spectrum above TV Channel 37 – the most critical spectrum for reallocation.[7] The Commission

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[6] In this context, CTIA is specifically referring to that downlink spectrum that would be paired with uplink spectrum as part of a FDD-based 600 MHz band plan.

[7] *See* Comments of T-Mobile USA, Inc., GN Docket No. 12-268, at 17-20 (June 14, 2013), ("T-Mobile Comments"); Comments of United States Cellular Corporation, GN Docket No. 12-268, at 11-17 (June 14, 2013) ("US Cellular Comments").

will be best positioned to achieve this outcome by selecting a "Down from 51" band plan approach. And while "different parties propose different variations on that theme," "the basic framework has near universal support."[8] Indeed, comments in this proceeding demonstrate the continued, widespread support for a "Down from 51" band plan concept that focuses on paired spectrum above TV Channel 37.[9] Conversely, opening comments reaffirm the widespread disapproval of the "split" band plan concept proposed by the Commission in the *Incentive Auction NPRM*.[10]

5 MHz Building Blocks. The record developed in response to the *Incentive Auction NPRM* contained overwhelming support for the Commission's proposal to license the 600 MHz band in 5 MHz "building blocks."[11] CTIA highlighted the fact that auctioning blocks of this size

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[8] Comments of AT&T Inc., GN Docket No. 12-268, at 2 (June 14, 2013) ("AT&T Comments"). *See also* Comments of Mobile Future, GN Docket No. 12-268, at 3 (June 14, 2013) ("Mobile Future Comments").

[9] *See* Comments of the Consumer Electronics Association, GN Docket No. 12-268, at 2-3 (June 14, 2013) ("CEA Comments"); Mobile Future Comments at 2-3; Comments of Motorola Mobility LLC, GN Docket No. 12-268, at 1 (June 14, 2013) ("Motorola Mobility Comments"); Comments of Qualcomm Incorporated, GN Docket No. 12-268, at I (June 14, 2013) ("Qualcomm Comments"); Comments of Research in Motion Corporation, GN Docket No. 12-268, at 5 (June 14, 2013) ("RIM Comments"); Comments of Spectrum Management Consulting Inc., GN Docket No. 12-268, at 1 (June 14, 2013) ("Spectrum Management Consulting Comments"); Comments of the Telecommunications Industry Association, GN Docket No. 12-268, at 3 (June 14, 2013) ("TIA Comments"); T-Mobile Comments at I; US Cellular Comments at 3; Comments of Verizon and Verizon Wireless, GN Docket No. 12-268, at 2 (June 14, 2013) ("Verizon Comments").

[10] *See, e.g.*, CEA Comments at 2; Comments of Lima Communications Corporation, Independence Television Company, Wand(TV) Partnership, Idaho Independent Television, Inc., and West Central Ohio Broadcasting, Inc., GN Docket No. 12-268, at 3 (June 14, 2013) ("Block Stations Comments"); Motorola Mobility Comments at 2; Comments of the National Association of Broadcasters, GN Docket No. 12-268, at 3 (June 14, 2013) ("NAB Comments"); US Cellular Comments at 13.

[11] Comments of CTIA – The Wireless Association, GN Docket No. 12-268, at 6 n. 16 (June 14, 2013) ("CTIA Comments") (detailing record support for this proposal); T-Mobile Comments at 11 (showing T-Mobile's preferred band plan with 5 MHz building blocks); US Cellular

would help support current wireless broadband technologies while providing flexibility to auction bidders. This support was reaffirmed in the instant proceeding. These block sizes "will maximize the number of licensed blocks in an area and will enable wireless carriers to provide mobile broadband services."[12] Such an approach also "comports with current industry practices and with the block sizes used in other bands"[13] and "will enable wireless carriers to use the spectrum flexibly and innovatively."[14] It is clear, then, that the 5 MHz "building block" approach should be part of any band plan developed by the Commission.

Consistent Baseline of Nationwide Downlink. While the amount of spectrum to be cleared in the 600 MHz band may vary by market, in a paired configuration variable amounts of uplink spectrum will be easier to manage than varying amounts of downlink spectrum. As the Commission has indicated, "by keeping the downlink spectrum consistent nationwide, we can help ensure as a technical matter that wireless providers will be able to offer mobile devices that can operate across the country, which should minimize design cost and interoperability concerns, and allow for greater economies of scale."[15] By ensuring that the downlink spectrum would be consistent nationwide, the Commission will minimize the effect on mobile device design requirements.

Comments at 12-13 (supporting a "Down from 51 hybrid" band plan that has 5 MHz building blocks).

[12] Comments of the Competitive Carriers Association, GN Docket No. 12-268, at 5 (June 14, 2013 ("CCA Comments").

[13] *Id.*

[14] AT&T Comments at 7-8.

[15] *Incentive Auction NPRM* at ¶ 124. *See also,* Comments of Alcatel-Lucent, GN Docket No. 12-268 at Appendix A (June 14, 2013) ("ALU Comments"); RIM Comments at 13; T-Mobile Comments at 14 (each providing band plans that attempt to maintain consistent downlink for variable amounts of spectrum).

Interference-Preventing Guard Bands. The Commission should adopt a band plan that includes certain guard bands – necessary to prevent interference – that also serve as a home to qualifying unlicensed operations. It is axiomatic that certain guard bands are necessary to prevent interference between different and otherwise adjacent services.[16] For example, Qualcomm stated that "[a] guard band of approximately 10 MHz between the last full power . . . TV station and the downlink block is the minimum needed to prevent a TV station from saturating a mobile device that is trying to receive."[17] While parties have advanced several different proposals regarding the required size of guard bands, it is clear that Congress intended for the Commission to exercise restraint in establishing guard bands. Meanwhile, CTIA and others continue to support the presence of qualifying unlicensed operations in guard bands, so long as they do not cause harmful interference to licensed services.[18]

Duplex Gap. The record makes clear that any band plan based on FDD technology would require a duplex gap of 10 MHz or more. Most commenters have supported a duplex gap between 10 and 14 MHz.[19] More critically, maintaining a *fixed* duplex gap will be vitally important, as "variable duplex spacing will make wireless handset design more complicated and expensive."[20] An appropriately-sized duplex gap would help prevent harmful interference and would be ideal from a device design perspective.

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16 *See* ALU Comments at Appendix A; RIM Comments at 13; T-Mobile Comments at 11 and 14.

17 Qualcomm Comments at 4.

18 *See, e.g.*, CEA Comments at 3.

19 *See* ALU Comments at Appendix A; RIM Comments at 13; T-Mobile Comments at 11.

20 NAB Comments at 8-9. *See also* RIM Comments at 12 ("Maintain a fixed duplex gap location – having more than one defined gap would be impractical to implement in user devices"); T-Mobile Comments at 14 (proposing a fixed 10 MHz duplex gap).

B. The Commission Should Address the Co- and Adjacent-Channel Interference Concerns Articulated by Commenters.

Commenters in this proceeding also continue to highlight the challenges created by broadcasters and wireless carriers operating on co- and adjacent channels in neighboring markets. While this concern was initially raised as a criticism of the Commission's proposed "split" band plan, any band plan that includes market variation will need to address this issue.

The record makes clear that co-channel interference is a major potential problem that must be avoided. This potential interference arises because "spectrum used for uplinks will be used elsewhere for television broadcasts."[21] Extremely large separation distances will be needed to mitigate interference between broadcasters and wireless carriers operating on the same or adjacent channels.[22] Estimates for the separation distance vary, but they are considerable: for example, Qualcomm has calculated that a distance of more than 300 miles would be necessary to avoid co-channel interference.[23] This will greatly increase the complexity of the incentive auction. The Consumer Electronics Association reports that "[t]he degree to which spectrum is encumbered by the potential for such interference will vary by frequency block, undermining the utility of particular spectrum blocks and the generic, interchangeable nature of the spectrum

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21 CEA Comments at 5.

22 NAB Comments at 5 ("Yet the *NPRM* in this proceeding and the *Public Notice* scarcely acknowledge that separation distances – indeed, quite large ones – will be needed to mitigate inherent interference between broadcasters and wireless carriers operating on the same or adjacent channels.").

23 Qualcomm Comments at 2 ("Moreover, neither plan allows for very much market variation because both plans would allow TV broadcast operations to occupy the same channel as mobile uplink operations in adjacent markets, which according to Qualcomm's calculations, would require a separation distances of more than 300 miles in order to avoid TV co-channel interference to mobile base station receivers.").

being auctioned."[24] Meanwhile, AT&T has suggested that preliminary indications are that separation distances could significantly limit the ability to offer different amounts of spectrum at auction on an Economic Area ('EA')-by-EA basis."[25]

The Bureau in the Public Notice seeks to downplay this problem by noting that even if more than 200 km separation distances are required, "the United States is more than an order of magnitude larger than those distances."[26] However, and as Alcatel-Lucent and others observed, constraints in one market may create a daisy-chain effect "where interference from TV stations operating in Market A might constrain Market B, which might constrain Market C, and so on."[27] This constraint could prove particularly problematic on the East Coast of the United States, where several key clearing markets are located in close proximity to each other and where the "daisy-chain" challenge is already a factor in allocating TV station allotments.

The Commission should continue to examine the issue of co-channel interference and should seek to minimize the wide-ranging co-channel interference issues identified by commenters in this proceeding. A critical step will be adopting an appropriate band plan that properly addresses this question.

C. The Record in This Proceeding Demonstrates Near-Unanimous Opposition to the Proposed "Down From 51 Reversed" Band Plan.

As CTIA indicated in its initial Comments, the "Down from 51 Reversed" band plan has several shortcomings that render it unsuitable for this spectrum. Participants in this proceeding echoed CTIA's concern regarding this band plan. A "Down from 51 Reversed" band plan would

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24 CEA Comments at 5-6.

25 AT&T Comments at 3.

26 Public Notice at n. 17.

27 ALU Comments at 6. *See also* NAB Comments at 5.

be spectrally inefficient, as it would require an additional guard band that other band plans would not. This band plan fails to capitalize on the technical characteristics of the upper portion of the UHF band that make it best suited for uplink operations, and indeed would increase the risk of interference. This, in turn, would negatively impact device design. Finally, commenters note that the "Down from 51 Reversed" band plan would cause particular harm to incumbent operations on TV Channel 37.

As RIM notes, the "Down from 51 Reversed" band plan is an "inefficient use of valuable spectrum."[28] This is because the "Down from 51 Reversed" approach "would require an extra guard band between the 600 MHz band and 700 MHz band."[29] The necessary insertion of this extra guard band has been lambasted by commenters as an unnecessary waste of much-needed spectrum.[30] Further, some commenters have noted that this could restrict the Commission's ability to pair spectrum blocks.[31] Meanwhile, the "original Down from Channel 51 band plan

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[28] RIM Comments at 6.

[29] Mobile Future Comments at 4-5.

[30] *See, e.g.*, ALU Comments at 4 ("The Down from 51 Reversed band plan starts at a disadvantage with respect to spectral efficiency because it must have both guard band separation from 700 MHz uplink . . . *and* must include a duplex gap."); Qualcomm Comments at 13 ("The [Down from 51 Reversed] band plan, in contrast, would place downlink spectrum at the upper end of the 600 MHz band and thus necessitate the use of a guard band of approximately 10 MHz at the uppermost portion of the band to protect the mobile device downlink operating in the uppermost portion of the 600 MHz band from the Lower 700 MHz A block uplink operations. This 10 MHz guard band would waste 40 percent of the spectrum . . . that is best suited for uplink operations and thus would not make optimal use of that spectrum."); Verizon Comments at 4 ("However, the need for an unnecessary guard band would likely reduce the total amount of spectrum (compared to the Industry Consensus Proposal) that is repurposed and auctioned under most (if not all) clearing scenarios.").

[31] ALU Comments at 5 ("Where the Down from 51 Reversed plan presents greatest concerns, however, is in moderately constrained markets. The drop in the much-prized paired spectrum in favor of supplemental downlink blocks . . . is particularly precipitous."); T-Mobile Comments at 10 ("The greater regularity of the Down from 51 Reversed Plan, however, comes at

offers many of the same benefits of the reversed plan, but does so without needing a guard band with the 700 MHz band."[32] CTIA therefore agrees with T-Mobile that "[g]iven the tremendous value of this low-band spectrum and the intense interest in it from all carriers in the market, and possibly from new players as well, the reduction in available supply of spectrum from the Down from 51 Reversed Plan is potentially very significant."[33] And, as others have observed, this reduction in licensed mobile broadband spectrum could adversely impact auction proceeds and competition, potentially increasing the risk of auction failure.[34]

The "Down from 51 Reversed" plan also "would present several technical challenges that the Down from 51 band plan would not, such as antenna inefficiencies and harmonic and intermodulation interference."[35] Several commenters observed that the upper portion of the 600 MHz band is best suited for uplink operations, yet the "Down from 51 Reversed" plan would place guard band and downlink spectrum at these frequencies, with uplink lower in the band.

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a significant price: less paired spectrum available for auction to support consumer wireless broadband services in those markets where at least 84 MHz is cleared.").

[32] Motorola Mobility Comments at 3.

[33] T-Mobile Comments at 11-12.

[34] AT&T Comments at 3-4 ("Second, by requiring one more guard band (between the 600 MHz downlink blocks and the 700 MHz uplink blocks) than does the Down from 51 band plan, the Down from 51 Reversed band plan would unwisely, and perhaps unlawfully, reduce materially the amount of spectrum available for licensed use, thereby diminishing the revenue potential and increasing the likelihood of auction failure."); CEA Comments at 4 ("First, a [Down from 51 Reversed] approach would reduce the amount of auctioned spectrum and adversely impact auction proceeds."); Spectrum Management Consulting Comments at 6 ("Including a guard band in the 600 MHz band plan creates an artificial and avoidable loss of potential revenue from the spectrum auction. In addition, reducing the amount of spectrum available at the auction impairs the competitiveness of the mobile marketplace.").

[35] AT&T Comments at 4. *See also* Verizon Comments at 4 ("Specifically, there are greater antenna efficiency losses in the lower frequencies, which support placing uplink in the upper part of the band in order to maximize the device's overall coverage.").

Such an approach could cause harmonic and intermodulation interference that could be highly disruptive to wireless operations in the band.[36]

Commenters also stated that the "Down from 51 Reversed" band plan could complicate device design, in large part because of the intermodulation and harmonics issues discussed above. RIM observed that because this band plan would involve a variable duplex gap, devices would require multiple filter components, making the "Down from 51 Reversed" plan "impractical from both an economical and a design point of view."[37] AT&T, meanwhile, found that "[p]lacing uplink in the lower part of the 600 MHz band could reduce the potential for reuse of an existing 700 MHz antenna, and could cause efficiency losses and form factor challenges with respect to receive antennas in user devices."[38] CEA cautioned that this band plan "may require a larger antenna in the user device (or reduce the efficiency of a smaller antenna)."[39] Given these device design limitations, CTIA agrees that it makes little sense to proceed with a "Down from 51 Reversed" plan.

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36 *See, e.g.*, CEA Comments at 5 ("Second, moving the uplink to lower frequencies has the potential to cause increased interference into other bands that will be used in consumer devices to provide services simultaneously. . ."); Motorola Mobility Comments at 3 ("Reverse intermodulation products generated by handset transmissions and TV broadcast transmissions would continue to be a concern for the mobile handset receive band . . . In addition, the Down from Channel 51 Reversed band plan would introduce 3rd order harmonic signals into the 2 GHz PCS Band."); AT&T Comments at 9 ("To the extent that it places uplink in any block lower than the 25 MHz immediately adjacent to the 700 MHz band – such as Channels 42-46 – the Down from 51 Reversed band plan is significantly more likely to cause harmful harmonic and intermodulation interference, including but not limited to disruption of carrier aggregation technology."); Qualcomm Comments at 13 ("The [Down from 51 Reversed] band plan also introduces the possibility of intermodulation products interfering with the mobile device uplink because it places mobile uplink operations in between TV stations and mobile downlink operations.").

37 RIM Comments at 8.

38 AT&T Comments at 9.

39 CEA Comments at 5.

Finally, numerous parties expressed concern regarding interference to Channel 37 operations caused by mobile uplink being located on adjacent frequencies. GE Healthcare warned that the consequences of this placement could be "disastrous" for wireless medical telemetry services.[40] Several commenters concluded that guard bands on either side of Channel 37 would be necessary to prevent damaging interference to Channel 37 services, further exacerbating the spectral inefficiency of this band plan.[41] Some commenters expressed that user devices may require special filtering to prevent this interference,[42] while others speculated that this band plan approach would necessitate the relocation of Channel 37 incumbents, an expensive undertaking.[43]

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[40] Comments of GE Healthcare, GN Docket No. 12-268, at 3 (June 14, 2013) ("GE Healthcare Comments"). See also Comments of the WMTS Coalition, GN Docket No. 12-268, at 3 (June 14, 2013) ("WMTS Coalition Comments") ("The Coalition has serious concerns that authorizing 600 MHz uplink operations in channels near to WMTS will have severely adverse consequences on the operation of incumbent WMTS licensees in Channel 37.").

[41] *See, e.g.*, Ericsson Comments at 8 ("The guardband necessary to help protect Channel 37's medical and scientific services—when considering band plans clearing more than 84 MHz—would be at least 6 MHz wide on either side of Channel 37 for TDD or FDD band plans wherever mobile uplink operation is present. . ."); Qualcomm Comments at 14 ("Placing uplink operations in the lower portion of the 600 MHz band adjacent to Channel 37 would increase the potential for interference to WMTS and radio astronomy operations and may require the addition of guard bands around Channel 37 to protect such operations. This problem is not present with the straight [Down from 51] band plan that locates downlink operations directly adjacent to Channel 37."); RIM Comments at 7 ("Altogether, the reversed plan would require a guard band at 698 MHz, a duplex gap, and guard bands adjacent to channel 37 or television channels for a total of 25 to 35 MHz of spectrum that . . . would be unusable by mobile services.").

[42] AT&T Comments at 9 ("Placing uplink rather than downlink adjacent to Channel 37 could make interference management regarding Channel 37 more difficult, given that millions of mobile user devices, rather than much fewer and fixed base stations, would be involved, and user devices may require special filtering to prevent interference to Channel 37.").

[43] Verizon Comments at 5 ("For example, end user devices in hospitals could interfere with medical telemetry operations, potentially requiring the relocation of existing Channel 37 operations. By contrast, Channel 37 operations do not need to be relocated under the Industry Consensus Proposal.").

In sum, the "Down from 51 Reversed" band plan has key drawbacks that make it unsuitable as a band plan approach for the 600 MHz band. In light of these limitations, it makes little sense to abandon the much more widely-supported "Down from 51" framework. CTIA has shown above that the record clearly opposes the "Down from 51 Reversed" proposal and the Commission should therefore reject adoption of it.

III. CERTAIN HARMFUL PROPOSALS ADVANCED IN THIS PROCEEDING MUST BE REJECTED.

A. The Commission Can and Should Find Ways to Accommodate Market Variation.

The Commission should reject calls from certain commenters who seek to curtail the amount of spectrum cleared for licensed mobile broadband in the name of ensuring nationwide uniformity. In its initial Comments, CTIA expressed concern with elements of the Commission's proposed "Down from 51" FDD band plan variants. In the Public Notice, the Bureau highlighted the fact that these band plans were developed in response to the need to accommodate market variation in the amount of spectrum cleared. Although CTIA did take issue with the band plans proposed in the Public Notice, CTIA understands that market variability will be a factor in developing a band plan, and is committed to working with the Commission to accommodate these market-by-market variances and maximize the amount of spectrum made available for wireless service. CTIA shares the Commission's concern that certain constrained markets may become the "least common denominator" for a nationwide band plan.[44] As has been documented, there may be markets where spectrum clearing will be a

[44] Remarks of Ruth Milkman, Chief, Wireless Telecommunications Bureau, FCC, Prepared for Delivery at Georgetown Center for Business and Public Policy and PCCA Workshop: "Optimal Coevolution of Mobile Broadband Technology and Spectrum Policy," (June 14, 2013), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0614/DOC-321617A1.pdf

significant challenge, but these markets should not hold back the rest of the country in terms of the amount of spectrum reallocated for mobile broadband.

Some broadcasters, however, have asserted that there is a need for a national band plan. For example, Sinclair has argued that a variable band plan would be "inherently inefficient and wasteful," would create uncertainty for bidders, would complicate device design, and would result in too much spectrum being allocated for mobile broadband.[45] Sinclair (and other broadcasters) has instead called for the Commission to stop the band plan at Channel 37 or above.[46] As CTIA stressed in its comments in this proceeding, the Commission's spectrum policy goals will be best served by developing a band plan that facilitates device design and inspires confidence from bidders. Over the course of this proceeding, technical experts from across the wireless industry have committed substantial time and effort toward developing a band plan that, while containing market-by-market variation, would nonetheless be manageable for the wireless industry. CTIA believes that the Commission can and should seek to achieve clearing of spectrum below TV Channel 37, and that a desire for an ideal, nationally uniform band plan should not preclude a maximal allocation of licensed spectrum for mobile broadband.

Much like the broadcaster commenters in this proceeding, the Wireless Internet Service Providers Association ("WISPA") has proposed that the Commission adopt a uniform band plan that auctions no more than 84 megahertz of spectrum between Channels 38 and 51.[47] WISPA

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45 Comments of Sinclair Broadcast Group, Inc., GN Docket No. 12-268, at 1-2 (June 14, 2013) ("Sinclair Comments").

46 NAB NPRM Comments at 20-21; NAB Comments at 11 ("The incentive auction should be designed to achieve a realistic nationwide band instead of attempting to maximize spectrum in each individual Economic Area, resulting in significant market variations that ultimately will prevent the use of spectrum effectively and efficiently everywhere.").

47 Comments of the Wireless Internet Service Providers Association, GN Docket No. 12-268, at 1 (June 14, 2013) ("WISPA Comments").

would instead have spectrum below Channel 37 allocated to unlicensed use, and has called for a minimum of 36 megahertz of contiguous spectrum to be set aside for unlicensed use.[48] Such action by the Commission would contravene the National Broadband Plan's goal of allocating 120 MHz of TV broadcast spectrum for licensed wireless services. While CTIA is a strong supporter of unlicensed operations and of finding a home for unlicensed services in the 600 MHz band, a 36 megahertz set-aside is far too much given the critical need for licensed mobile broadband spectrum, the suitability of this spectrum for licensed services, the dictates of the Spectrum Act to raise sufficient revenue to reimburse broadcasters as well as fund the national public safety network and the shortage of suitable spectrum bands for mobile broadband. The Commission therefore should reject WISPA's proposed scheme for the 600 MHz band plan.

B. The Commission Must Reject Calls to Permit 50 kW Broadcast Operations in the 600 MHz Band.

Another proposal advanced in this proceeding would greatly hinder wireless operations in the 600 MHz band. In its Comments, Sinclair has proposed a 600 MHz band plan in which 50 kW broadcast operations would be permitted in at least half of the assignments.[49] Sinclair argues that higher power blocks "permit differentiation and innovation" and that they will "attract

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[48] *Id.* at 5-6 ("If despite the record and the above discussion the Commission nevertheless decides to adopt a 'market variation' design that makes unpaired spectrum below Channel 37 available for auction, the Commission should ensure that at least 36 megahertz of contiguous white space spectrum remains in every market.").

[49] CTIA would note that Sinclair has provided no technical detail on its proposal. Other than noting that power levels should be permitted at 50 kW, Sinclair does not provide information on channel block sizes, out of band emission limits or power limits on adjacent band spectrum. Nor does Sinclair provide any detail on the amount of guard bands it anticipates is required to protect low power mobile broadband services that would operate in adjacent spectrum to its proposed high power operations. CTIA believes this lack of technical detail should also lead the Commission to disregard the Sinclair proposal.

different classes of bidders to the auction."[50] The Commission should reject any band plan proposal that would permit high-power operations as proposed by Sinclair. Allowing base stations to operate at power levels that are much higher than that generally permitted would have a preclusive effect on effective use of the 600 MHz band. In particular, additional guard bands would be required, resulting in less spectrum available for mobile broadband services.

The wireless industry's previous experience with high powered operations in the 700 MHz band should inform this proceeding. Initially, the Commission permitted licensees on the unpaired Lower 700 MHz D and E Blocks to operate base stations at 50 kW only to lower the power limits due to significant interference concerns raised by adjacent band licensees.[51] Surrounding operations on the Lower 700 MHz A and B blocks were subject to much lower power limits.[52] Several parties expressed concern that if the D and E Blocks were to be operated at the power levels permitted by the Commission, adjacent licensees would suffer significant harmful interference.[53] The Commission agreed, concluding that its decision to lower the power limit on the D and E Blocks "serves the public interest by limiting the potential for harmful interference to other lower 700 MHz licensees."[54] Given the wireless industry's experience in the Lower 700 MHz band, the Commission should not repeat this scenario in the 600 MHz band. Further, the framework proposed by Sinclair would be incompatible with the "Down from 51"

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50 Sinclair Comments at 7.

51 *See Application of AT&T Inc. and Qualcomm Incorporated (For Consent to Assign Licenses and Authorizations)*, Order, 26 FCC Rcd 17589, ¶ 59 (2011).

52 *Id.*

53 *Id.* at ¶ 60.

54 *Id.* at ¶ 63.

concept that has broad support from both the wireless and broadcast industries. For these reasons, Sinclair's proposal to permit 50 kW operations should be rejected.

C. There is No Need for Additional Protections for TV Channel 37 in a "Down From 51" Band Plan.

Finally, the Commission should deny GE Healthcare's request to adopt new protections for TV Channel 37 operations in a traditional "Down from 51" band plan where the spectrum adjacent to TV Channel 37 would be used for base station downlink.[55] GE Healthcare argued that for Channel 37 operations to be sufficiently protected, the Commission must require wireless licensees to coordinate the construction of their facilities with nearby WMTS systems, limit wireless power in Channels 36 and 38, and limit out-of-band emissions within Channel 37.[56]

In the *Incentive Auction NPRM*, the Commission noted that TV broadcast stations currently operate in Channels 36 and 38 without causing harmful interference to Channel 37 operations, and therefore there need not be any special protections from much lower power wireless services.[57] CTIA supported this proposal in the initial round of comments,[58] and continues to do so today. The Commission should once again affirm that existing operations in Channel 37 should receive no new interference protections from new entrants than what they currently have from TV broadcasting incumbents.

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55 GE Healthcare Comments at 7-8.

56 *Id.*

57 *Incentive Auction NPRM* at ¶ 135 ("In addition, we do not anticipate needing a guard band between the downlink band and existing channel 37 operations . . . because they currently operate adjacent to broadcast television bands without interference.").

58 CTIA NPRM Comments at 22.

IV. THE COMMISSION SHOULD CONTINUE TO WORK TOWARD PROVIDING THE COMPLETE REPACKING ALGORITHM FOR PUBLIC COMMENT.

While CTIA strongly supports early action on a band plan for the 600 MHz spectrum, it also believes that the Commission must move forward rapidly with its repacking algorithm. As CTIA has previously indicated to the Commission in past comments, completion of internal Commission work on its repacking algorithm is a critical piece to the incentive auction puzzle.[59] CTIA urges the Commission to complete its repacking algorithm and make it available for public comment. Prompt action by the Commission to release the repacking algorithm will enable all affected stakeholders the opportunity to understand the Commission's methodology, while ensuring that the algorithm is the most effective and efficient model for repacking broadcast stations.

[59] *See* Comments of CTIA—The Wireless Association®, GN Docket No. 12-268, at 20 (March 21, 2013).

V. CONCLUSION

CTIA appreciates the Commission's close examination of the issues involved with developing an optimal 600 MHz band plan. In light of the record developed both in this proceeding and in response to the *Incentive Auction NPRM*, CTIA urges the Commission to adhere to the key principles advanced by industry stakeholders, to reject band plans that have received widespread disapproval, and to deny requests that would lead to inefficient use of the 600 MHz band. In addition, a prompt release of the Commission's repacking algorithm will enable key stakeholders to further examine the myriad technical issues at play in this proceeding and help develop an optimal band plan.

Respectfully submitted,

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